

Finding Ship tracks in NASA MODIS Images with a Deep Neural Network Model

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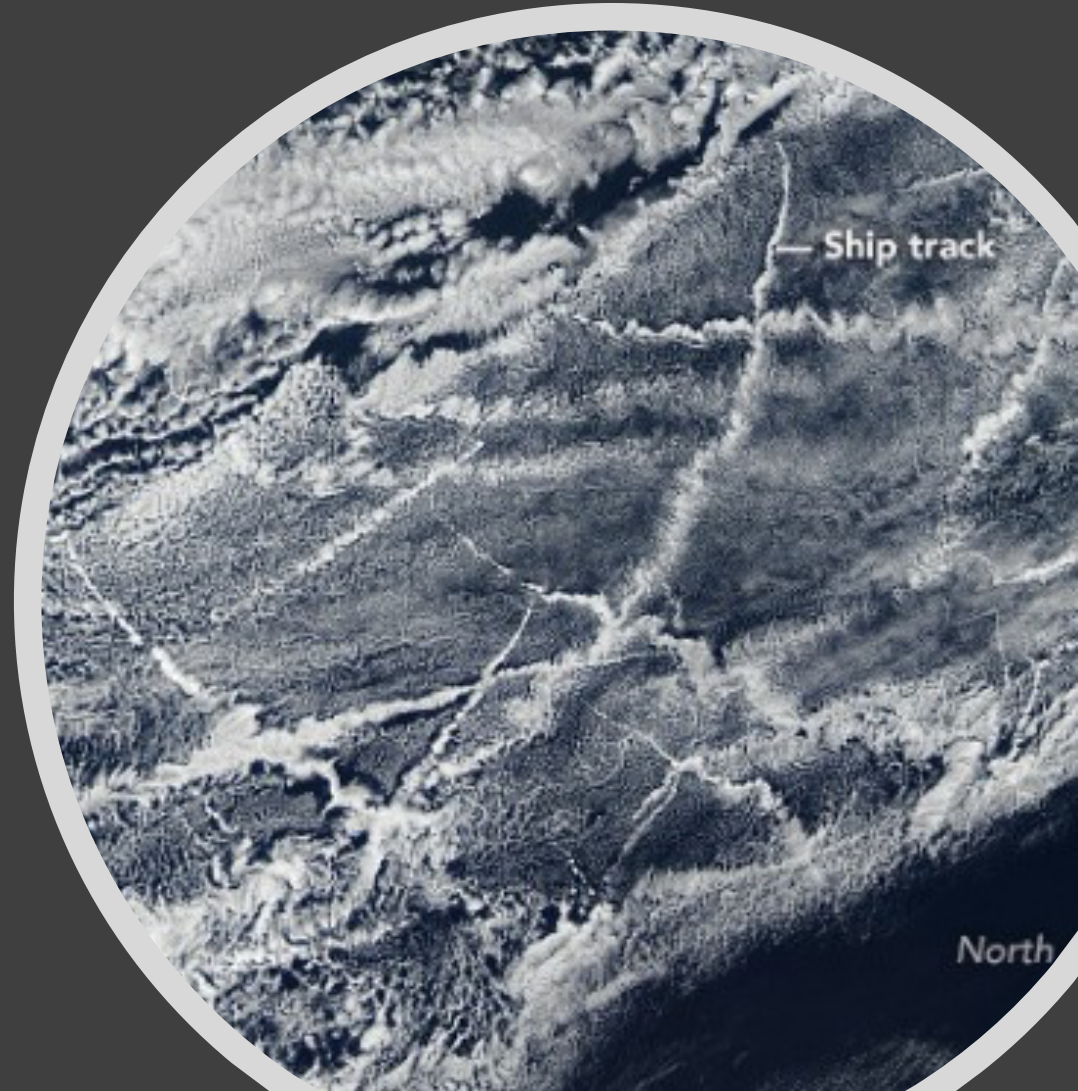
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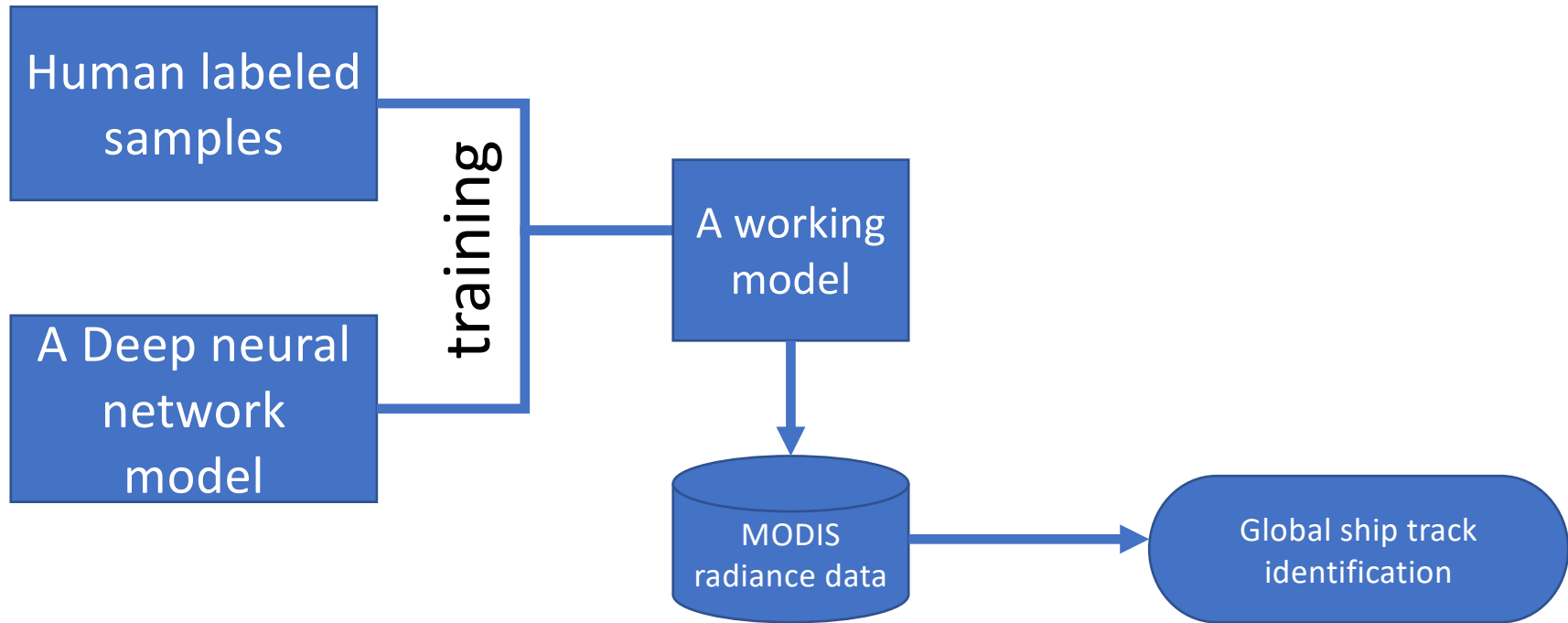
Problem introduction



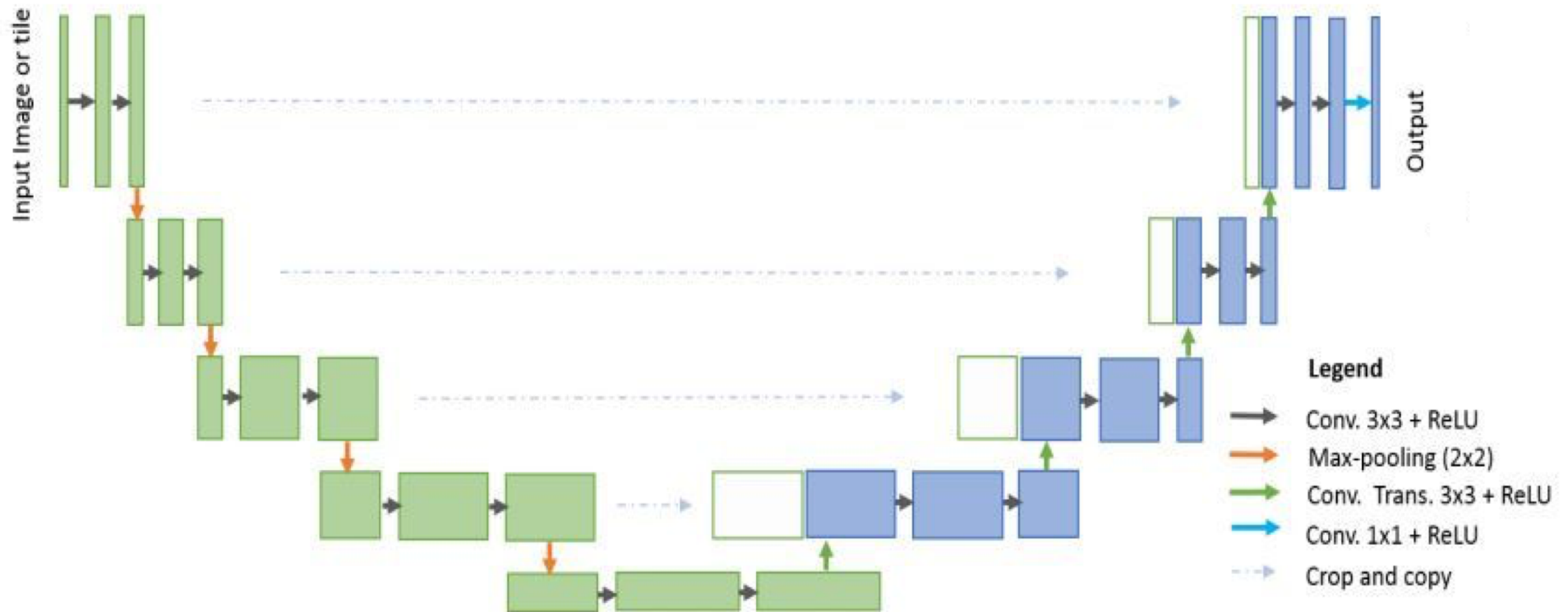
Current Challenges

- Identifying tracks is expensive: e.g. The most comprehensive study only included a few thousand ship tracks
- No nighttime/global coverage
- No real-time capability

Our approach

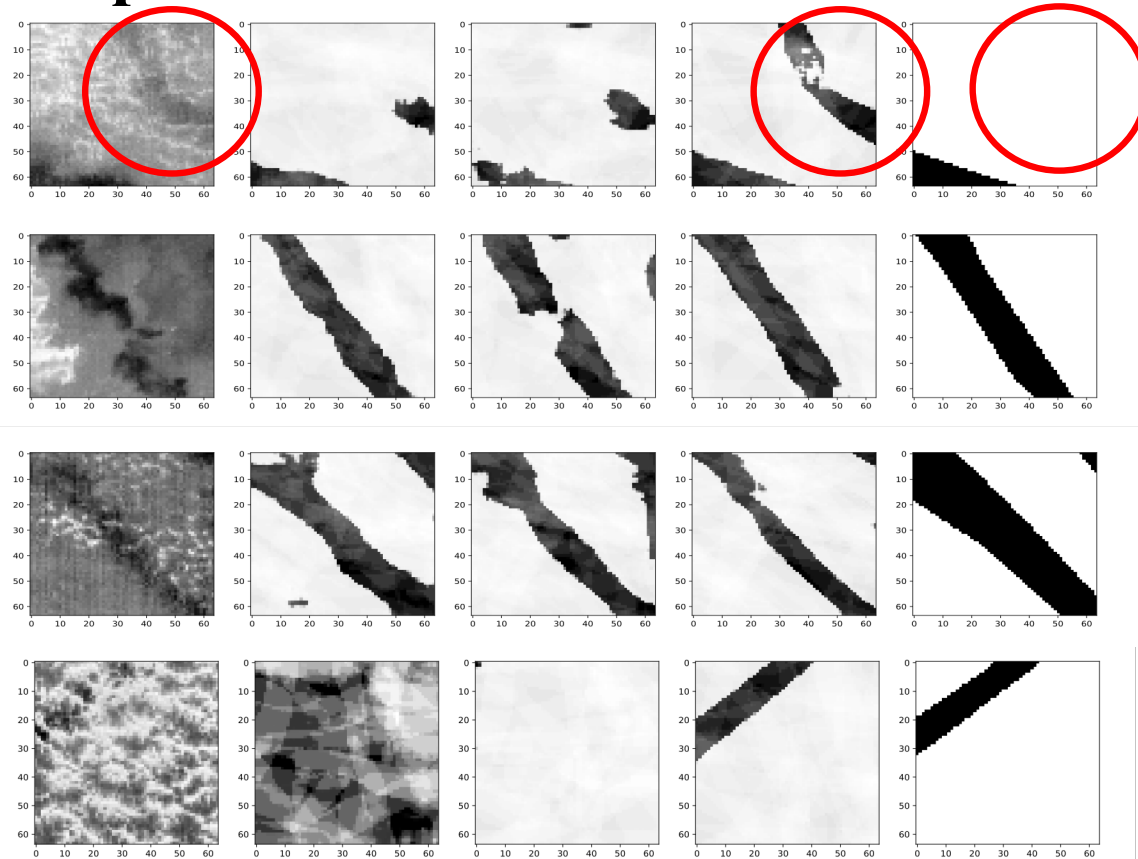


Model architecture

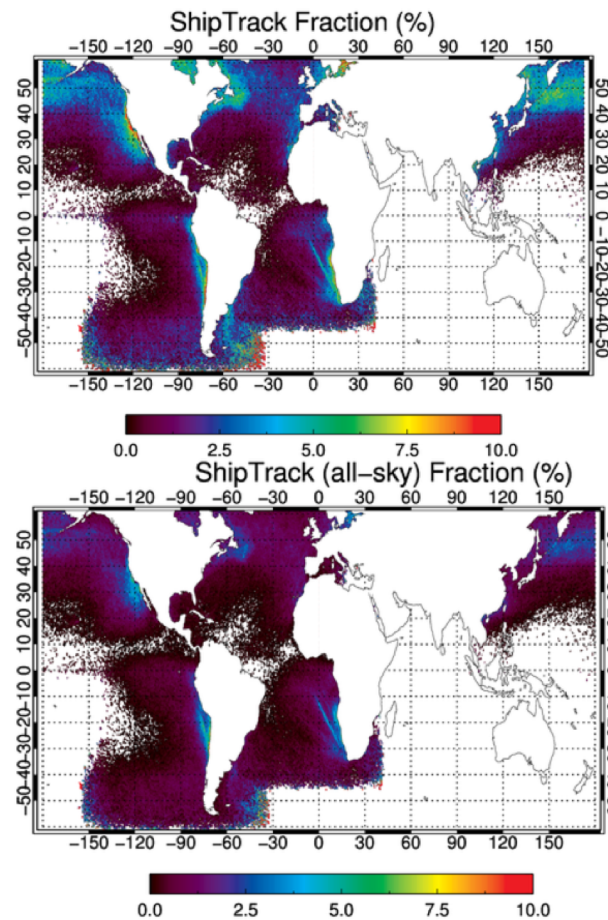
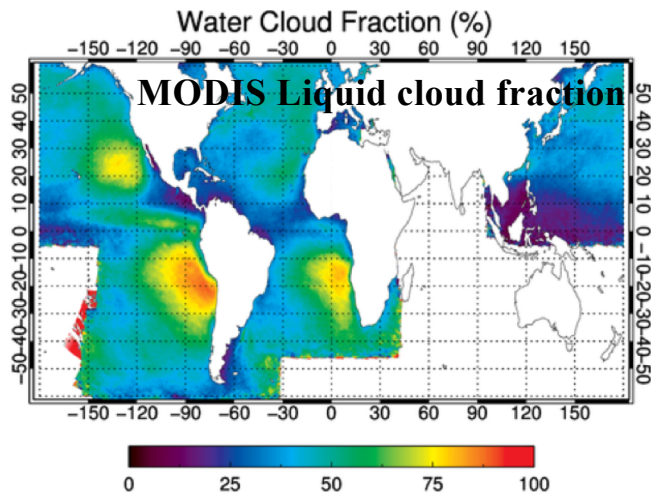


Model performance

Input M 1 M 2 M 3 Human



Results



1 year, 3 Tb data

**40-50X on
NCCS GPUs**

**$O(10^6)$ ship
tracks, several
orders of
increase in
sampling**

Ongoing and future work

- Testing/Training a daytime model for MODIS data
- Applying the technique to GOES data to get time evolution
- Carrying out scientific analysis on the unprecedented samples
- Real-time applications

Conclusion

- We developed a supervised deep neural network model to find ship tracks in MODIS images
- Increased sampling capability will have a profound impact on scientific understanding in terms of efficiency and sampling robustness
- IT infrastructure is crucial